

## NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

### PEST MANAGEMENT

(Acre)

CODE 595

#### DEFINITION

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species), that directly or indirectly cause damage or annoyance.

#### PURPOSES

This practice is applied as part of a Resource Management System (RMS) to support one or more of the following purposes:

- Enhance quantity and quality of commodities.
- Minimize negative impacts of pest control on soil resources, water resources, air resources, plant resources, animal resources and/or humans.

#### CONDITIONS WHERE PRACTICE APPLIES

Wherever pests will be managed.

#### CRITERIA

##### General Criteria Applicable to All Purposes

A pest management component of a conservation plan shall be developed.

NRCS employees in Maine who provide pest management guidance shall obtain and maintain certification as a "Certified Pesticide Applicator (Commercial)" in the area of "Agricultural Pest Control – Plants 1B" as granted by the Maine Department of Agriculture, Food and Rural Resources –

Board of Pesticides Control.

All methods of pest management must comply with Federal, State, and local regulations, including management plans for invasive pest species, noxious weeds and disease vectors. Compliance with the Food Quality Protection Act (FQPA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Worker Protection Standard (WPS); and Interim Endangered Species Protection Program (H7506C) is required for chemical pest control.

Integrated Pest Management (IPM) that strives to balance economics, efficacy and environmental risk, where available, shall be incorporated into planning alternatives. (IPM is a sustainable approach to pest control that combines the use of prevention, avoidance, monitoring and suppression strategies, to maintain pest populations below economically damaging levels, to minimize pest resistance, and to minimize harmful effects of pest control on human health and environmental resources. IPM suppression systems include biological controls, cultural controls and the judicious use of chemical controls.)

IPM programs available in Maine are administered through the University of Maine Cooperative Extension, Pest management Office in Orono and are on their web site <http://www.umext.maine.edu/topics/pest.htm>. The following IPM programs are available:

- Apples
- Blueberries
- Cranberries
- Potatoes
- Strawberries

- Sweet Corn
- Broccoli

The Pest Management Office also operates the Insect and Plant Disease Diagnostic lab.

An appropriate set of management techniques and conservation practices (mitigation techniques) must be planned and implemented to reduce the environmental risks of pest management activities in accordance with quality criteria in the local Field Office Technical Guide. Suggested techniques and practices are listed in Table 1.

All methods of pest management must be integrated with other components of the conservation plan.

Clients shall be instructed to pay special attention to all environmental hazards and site-specific application criteria listed on pesticide labels and contained in Extension and Crop Consultant recommendations.

#### **Additional Criteria to Protect Quantity and Quality of Commodities**

As an essential component of both commodity-specific IPM and IPM general principles, clients shall be encouraged to use the minimum level of pest control necessary to meet their objectives for commodity quantity and quality.

#### **Additional Criteria to Protect Soil Resources**

In conjunction with other conservation practices, the number, sequence and timing of tillage operations shall be managed to maintain soil quality and maintain soil loss at or below the soil loss tolerance (T) or any other planned soil loss objective. The Revised Universal Soil Loss Equation (RUSLE) will be used for soil erosion prediction.

Clients shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in soil that may negatively impact non-target plants, animals and humans.

#### **Additional Criteria to Protect Water Resources**

Pest management environmental risks, including the impacts of pesticides in ground and surface water on humans and non-target plants and animals, must be evaluated for all identified water resource concerns. Identified water resource concerns may include:

- Public and private wells
- Water bodies used for public water supplies
- Groundwater Aquifers
- Endangered Species Habitats
- States 303(d) list of impaired surface waters for which TMDLs have been developed and where pesticides have been identified as a pollutant.

Environmental risks will be evaluated using NRCS' Windows Pesticide Screening Tool (WIN-PST).

When a chosen alternative has significant potential to negatively impact important water resources (e.g., WIN-PST "Extra High", "High" or "Intermediate" soil/pesticide human risk ratings in the drainage area of a drinking water reservoir), an appropriate set of management techniques and conservation practices must be put in place to address risks to humans and non-target plants and animals.

Table I contains a list of management techniques and conservation practices to reduce impacts of pesticides on water quality and their relative effectiveness by pesticide loss pathways.

The number of practices needed can be determined using the following guidance:

#### **Interpreting WIN-PST Hazard Ratings**

**X = Extra High** Even with 2, 3 or more mitigation techniques and practices, the RMS level may not be reached.

**H = High** 2 or 3 techniques and practices are usually needed to meet RMS criteria.

**I = Intermediate** 1 or 2 techniques and practices are usually needed to meet RMS level criteria.

**L = Low** Meets RMS criteria without mitigation if label is followed.

**V = Very Low (Leaching)** Meets RMS criteria without mitigation if label is followed.

Clients shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in leachate and runoff that may negatively impact non-target plants, animals and humans.

The number, sequence and timing of tillage operations shall be managed in conjunction with other sediment control tactics and practices, in order to minimize sediment losses to nearby surface water bodies.

#### **Additional Criteria to Protect Air Resources**

Clients shall be encouraged to pay special attention to pesticide label instructions for minimizing volatilization and drift that may negatively impact non-target plants, animals and humans.

Consider weather conditions and environmental behavior of pesticides to reduce volatilization and drift.

#### **Additional Criteria to Protect Plant Resources**

Clients shall be encouraged to pay special attention to pesticide label instructions including those directed at:

- Preventing misdirected pest management control measures that negatively impact plants (e.g., removing pesticide residues from sprayers before moving to the next crop and properly adjusting cultivator teeth and flame burners).
- Appropriate climatic conditions, crop stage, soil moisture, pH, and organic matter in order to protect plant health.
- Limiting pesticide residues in soil that can carry over and harm subsequent crops.

#### **Additional Criteria to Protect Animal Resources**

Clients shall be encouraged to pay special attention to pesticide label instructions that minimize negative impacts to animals.

#### **Additional Criteria to Protect Humans**

Clients shall be encouraged to pay special attention to pesticide label instructions that minimize negative impacts to humans.

## **CONSIDERATIONS**

If commodity-specific IPM is not available, the following IPM principles should be considered: **Specific IPM Strategies are listed in Table 2.**

- **Prevention - Preventing Pest Populations.**
- **Avoidance** - Avoiding Pest Populations.
- **Monitoring** - Identifying the extent of pest populations and/or the probability of future populations to help target suppression strategies and avoid routine preventative pest control.
- **Suppression** - Using cultural, biological and chemical controls to reduce a pest population or its impacts. Chemical controls should be used judiciously in order to minimize environmental risk and pest resistance.

Adequate plant nutrients and soil moisture, including favorable pH and soil conditions, should be available to reduce plant stress, improve plant vigor and increase the plant's overall ability to tolerate pests.

On irrigated land, irrigation water management should be designed to minimize pest management environmental risk.

## **PLANS AND SPECIFICATIONS**

The pest management component of a conservation plan shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s).

As a minimum, the pest management component of a conservation plan shall include:

- Plan map and soil map of managed site, if applicable (use RMS plan maps if available).
- Location of sensitive resources and setbacks, if applicable (use RMS plan maps if available).
- Environmental risk analysis, with approved tools and/or procedures, for probable pest management recommendations by crop (if applicable) and pest.

- Interpretation of the environmental risk analysis and identification of appropriate management and conservation practices to mitigate the risks identified.
- Operation and maintenance requirements.

## OPERATION AND MAINTENANCE

The pest management component of a conservation plan shall include appropriate operation and maintenance items for the client. These may include:

- Review and update the plan periodically in order to incorporate new IPM technology, respond to cropping system and pest complex changes, and avoid the development of pest resistance.
- Maintain management and conservation practices identified in the plan in order to ensure continued effectiveness.
- Develop a safety plan for individuals exposed to chemicals, including telephone numbers and addresses of emergency treatment centers for individuals exposed to chemicals and the telephone number for the nearest poison control center. The National Pesticides Information Center (NPIC) telephone number in Corvallis, Oregon may also be given for non-emergency information:

**1-800-858-7384**

Monday - Friday

6:30 a.m. to 4:30 p.m. Pacific Time

For advice and assistance with emergency spills that involve agrichemicals, the local emergency telephone number should be provided. The national 24-hour CHEMTREC telephone number may also be given:

**1-800-424-9300**

- Follow label requirements for - mixing/loading setbacks from wells, intermittent streams and rivers, natural or impounded ponds and lakes, or reservoirs. Maine Department of Agriculture, Board of Pesticides Control Chapter 29 - Standards for Water Quality Protection (<http://www.state.me.us/sos/cec/rcn/apa/01/chaps01.htm>) specifies the following:

**A.** No person shall mix or load any pesticides or fill a sprayer or mix tank within fifty (50) feet from the high water mark of any surface waters of the State.

**B.** No person shall use a pump that pumps pesticide concentrate or formulation or any hose that has been in contact with pesticide solution to draw liquid from any surface waters.

**C.** All pesticide pumping systems that come in contact with any surface waters shall be equipped with an anti-siphoning device.

- Post signs according to label directions and/or Federal, State, and local laws around sites that have been treated. Follow restricted entry intervals.
- Dispose of pesticides and pesticide containers in accordance with label directions and adhere to Federal, State, and local regulations. See Maine Department of Agriculture, Board of Pesticides Control Chapter 21 – Pesticide Container Disposal and Storage (<http://www.state.me.us/sos/cec/rcn/apa/01/chaps01.htm>).
- Read and follow label directions and maintain appropriate Material Safety Data Sheets (MSDS).
- Calibrate application equipment according to Extension and/or manufacturer recommendations before each seasonal use and with each major chemical change.
- Maintain mechanical equipment in good working condition. Replace worn nozzle tips, cracked hoses, and faulty gauges. Replace worn components on other pest management implements as well.
- Maintain records of pest management for at least two years. Pesticide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide Record Keeping Program. State of Maine specific requirements are described in Maine Department of Agriculture, Board of Pesticides Control Chapter 50 – Record Keeping and Reporting Requirements (<http://www.state.me.us/sos/cec/rcn/apa/01/chaps01.htm>). This rule requires **all Commercial Agricultural Producers**

(food crop, forage, forest product, animal, turf, greenhouse, nursery, Christmas tree, aquaculture, and organic growers) to keep records of **all applications** using **any pesticide** (organic or synthetic), indoors and outdoors and using **any method of application**, powered or non-powered.

This rule also lists required reporting items. A Pesticide Applicator Log, which includes all the required reporting items, can be obtained from the University of Maine Cooperative Extension.

**TABLE I – Effectiveness Guide - Reducing Pesticide Impacts on Water Quality**

Note: Pest Management (595) requires environmental evaluation and appropriate mitigation for all identified resource concerns. This table identifies management techniques and conservation practices that have the potential to mitigate (reduce or minimize) pesticide impacts on water quality. Not all techniques will be applicable to a given situation. Relative effectiveness ratings by pesticide loss pathway are “no effect” (blank), “slight effect” (+/-) “moderate effect” (++)/(-), and “significant effect” (+++/---). Positive ratings are shown by “+”, “++”, or “+++”. Negative effects are shown by “-”, “--”, or “---”. The table also shows how the techniques and practices function. Effectiveness of any technique or practice can be highly variable based on site conditions and how it is designed. Therefore, with guidance provided by the table, site-specific selection and design of mitigation techniques and practices that are appropriate for identified resource concerns is left to the professional judgement of the conservation planner.

Pest Management Techniques and Practices for water quality	Relative Effectiveness by Pesticide Loss Pathways			Function/Comments
	Leaching	Adsorbed Runoff	Solution Runoff	
<b>Management Practices <sup>1/</sup></b>				
Pesticide Label Environmental Hazard Warnings and BMPs	Required 2/	Required 2/	Required 2/	Label guidance must be carefully followed for pesticide applications near waterbodies and on soils that are vulnerable to erosion, runoff, or leaching.
Scouting and Integrated Pest Management (IPM) thresholds	+++	+++	+++	Reduces exposure potential - reduces the amount of pesticide applied
Lower Application Rate	+++	+++	+++	Reduces exposure - use lowest effective rate. Most effective with highly soluble pesticides
Substitution – Alternative pesticides Cultural controls Biological controls	+++	+++	+++	Use alternative pesticides with low environmental risk. Substituting cultural and biological controls can reduce the need for pesticides.
Partial Treatment	+++	+++	+++	Banding and directed spraying, most effective with strongly adsorbed pesticides
Formulations/Adjuvants	+++	+	++	Formulations and/or adjuvants that increase efficacy allow lower application rates
Soil Incorporation	---	+++	+++	Reduces exposure potential for surface losses, but increases exposure for leaching losses
Application Timing	+++	+++	+++	Delaying application when significant rainfall events are forecast can reduce pesticide transport to ground or surface water. Delaying application when wind speed is not in accordance with label requirements can reduce pesticide drift to surface water.
Set-back	+	++	++	Reduces exposure - greater distance from surface water and less inadvertent application to water body, greater distance to entry point

Pest Management Techniques and Practices for water quality	Relative Effectiveness by Pesticide Loss Pathways			Function/Comments
	Leaching	Adsorbed Runoff	Solution Runoff	
<b>Conservation Practices <sup>3/</sup></b>				
Agrichemical Handling Facility (702)	+++	+++	+++	Reduces the potential for point source pesticide contamination
Brush Management (314)	+++	+++	+++	Using non-chemical brush control reduces the need for pesticides.
Conservation Cover (327)	+++	+++	+++	Retiring land from annual crop production often reduces the need for pesticides
Conservation Crop Rotation (328)	++	+++	+++	Reduces the need for pesticides by breaking pest lifecycles.
Contour Buffer Strips (332)		++	++	Increases infiltration, reduces soil erosion
Contour Farming (330)		+	+	Increases infiltration and deep percolation, Reduces runoff and soil erosion
Contour Stripcropping (585)		++	++	Increase infiltration, reduces erosion
Cover Crop (340)	+	++	+	Increase infiltration, reduces soil erosion build soil organic matter
Deep Tillage (324)	-	+	+	Increases infiltration and deed percolation
Diversions (362)	+	+	+	Reduces exposure potential - water is diverted
Field Border (386)		++	+	Increases infiltration and traps adsorbed pesticides, often reduces application area, provide habitat for beneficial insects and congregate pests, reduce inadvertent pesticide application and drift to surface water
Filter Strip (393)		+++	++	Increases infiltration and traps adsorbed pesticides, often reduces application area, provide habitat for beneficial insects and congregate pests, reduce inadvertent pesticide application and drift to surface water
Floodwater Diversion (400)	+	+	+	Reduces exposure potential - floodwater is diverted
Forage Harvest Management (511)	++	++	++	Reduces exposure potential - timely harvesting reduces the need for pesticides
Forest Stand Improvement (666)	++	++	++	Reduces the potential for pest damage and the need for pesticides
Grade Stabilization Structure (410)		+++	++	Traps adsorbed pesticides
Grassed Waterway (412)		+++	+	Increases infiltration and traps adsorbed pesticides (should be applied with Filter Strips at the outlet and on each side of the waterway

Pest Management Techniques and Practices for water quality	Relative Effectiveness by Pesticide Loss Pathways			Function/Comments
	Leaching	Adsorbed Runoff	Solution Runoff	
Irrigation System, Microirrigation (441)	++	+++	+++	Reduces exposure potential - efficient and uniform irrigation reduces pesticide transport to ground and surface water
Irrigation System, Sprinkler (442)	++	++	++	Reduces exposure potential - efficient and uniform irrigation reduces pesticide transport to ground and surface water
Irrigation Water Management (449)	+++	+++	+++	Reduces exposure potential – water is applied at rates that minimize pesticide transport to ground and surface water, promotes healthy plants which can better tolerate pests
Land Smoothing (466)	+	+	+	Reduces exposure potential – Uniform surface reduces pesticide transport to ground and surface water
Mulching (484)	+	+/-	+/-	Often reduces the need for pesticides, natural mulches increase infiltration and reduce soil erosion (+), artificial mulches may increase runoff and erosion (-)
Nutrient Management (590)	++	++	++	Promotes healthy plants which can better tolerate pests
Pasture and Hay Planting (512)	++	+++	+++	Rotation including perennial grasses and legumes generally require fewer pesticides
Precision Land Forming (462)	++	++	+	Uniform surface reduces pesticide transport to ground and surface water
Prescribed Burning (338)	++	++	++	Often reduces the need for pesticides
Prescribed Grazing (528A)	++	+++	+++	Proper management of grazing and browsing animals improves plant health reducing the need for pesticides
Residue Management, No-Till and Strip Till (329A)	+	+++	++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Mulch-Till (329B)	+	+++	++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Ridge Till (329C)	+	+++	++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Seasonal (344)	+	+	+	Increases infiltration, reduces soil erosion, builds soil organic matter
Riparian Forest Buffer (391)	+	+++	+++	Increases infiltration, reduces soil erosion, builds soil organic matter
Sediment Basin (350)		++		Captures pesticide residues and facilitates their degradation



Pest Management Techniques and Practices for water quality	Relative Effectiveness by Pesticide Loss Pathways			Function/Comments
	Leaching	Adsorbed Runoff	Solution Runoff	
Structure for Water control (587)	-	+++	++	Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation
Subsurface Drain (606)	+	++	++	Increases infiltration and aerobic pesticide degradation in the rootzone *Note – avoid direct outlets to surface water
Surface drainage, Field Ditch (607)	+	+	+	Increases infiltration and aerobic pesticide degradation in the rootzone *Note – avoid direct outlets to surface water
Terrace (600)	--	+++	++	Increases infiltration and deep percolation, reduces soil erosion
Tree and Shrub Establishment (612)	+++	+++	+++	Retiring land from annual crop production often reduces need for pesticides, increases infiltration, builds soil organic matter
Waste Storage Facility (313)	+	++	++	Captures pesticide residues
Waste treatment Lagoon (359)		+++	+++	Captures pesticide residues and facilitates their degradation
Waste Utilization (633)	++	++	++	Increases soil organic matter
Water and Sediment control Basin (638)	-	+++	++	Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation
Well Decommissioning (351)	+++			Eliminates point source contamination
Wetland Restoration (657)	+	+	+	Captures pesticide residues and facilitates their degradation
Wetland Wildlife Habitat Management (644)	++	++	++	Filtering and degradation of pesticides entering wetland environments

<sup>1/</sup> Additional information on pest management mitigation techniques and practices can be obtained from pesticide labels, UMCE Pest Management Specialists, MOFGA, publications, and pest management consultants.

<sup>2/</sup> The Pesticide label is the law. All pesticide label specifications must be carefully followed, including required mitigation. Additional mitigation may be needed to meet NRCS pest management requirements for identified resource concerns.

<sup>3/</sup> Details regarding the effects of conservation practices on ground and surface water contamination by pesticides are contained in the Conservation Practice Physical Effects found in the Maine NRCS eFOTG, Section V.

## **Table 2 Integrated Pest Management Principles and Strategies**

### **PREVENTION “Preventing Pest Populations”**

- Using pest free seeds and transplants
- Preventing weeds from reproducing
- Irrigation scheduling to avoid situations conducive to disease development
- Cleaning tillage and harvesting equipment
- Using field sanitation procedures
- Eliminating alternate hosts or sites for insect pests and disease organisms

### **AVOIDANCE “Avoiding Pest Populations”**

- Crop rotation
- Choosing cultivars with resistance to pests
- Using trap crops or pheromone traps
- Choosing cultivars with maturity dates that may allow harvest before pest populations develop
- Fertilization programs to promote rapid development
- Not planting in certain areas where pest populations are likely to cause crop failure

### **MONITORING “Identifying the extent of pest populations and/or the probability of future populations”**

- Surveys and scouting programs including:
  - trapping
  - weather monitoring
  - soil testing
- Records should be kept of pest incidence and distribution for each field.
- Records form the basis of:
  - crop rotation selection
  - economic thresholds
  - suppressive actions

### **SUPPRESSION “Using Cultural, Physical, Biological, and Chemical controls to Reduce a pest population or its impacts”**

- **Cultural Practices**
  - Crop rotations
  - Narrow row spacings
  - Optimized in-row plant spacings
  - Alternate tillage approaches such as no till or strip till systems
  - Cover crops or mulches
  - Using crops with allelopathic potential in the rotation
- **Physical Suppression**
  - Cultivation, hoeing, handweeding
  - Pruning, vacuuming
  - Mowing for weed control

- Baited or pheromone traps for certain insects
- Temperature Management
- Exclusion devices for insects or disease management
- **Biological Controls**
  - Mating disruption for insects
  - Conserving naturally occurring biological controls
- **Chemical Controls**
  - Used as a last resort following sound management that includes:
    1. Cost-benefit should be confirmed before use.
    2. Pesticides selected on least negative effects on environment and human health in addition to efficacy and economics.
    3. Limit applications to areas where pests actually exist or are reasonably expected.
    4. Sprayers or other application devices should be calibrated prior to use and occasionally during the use season.
    5. Chemicals with same mode of action should not be used continuously.
    6. Vegetative buffers should be used around stream banks to minimize chemical movement to surface waters.